Animation of Jupiter images

Voyager 3 and other projects

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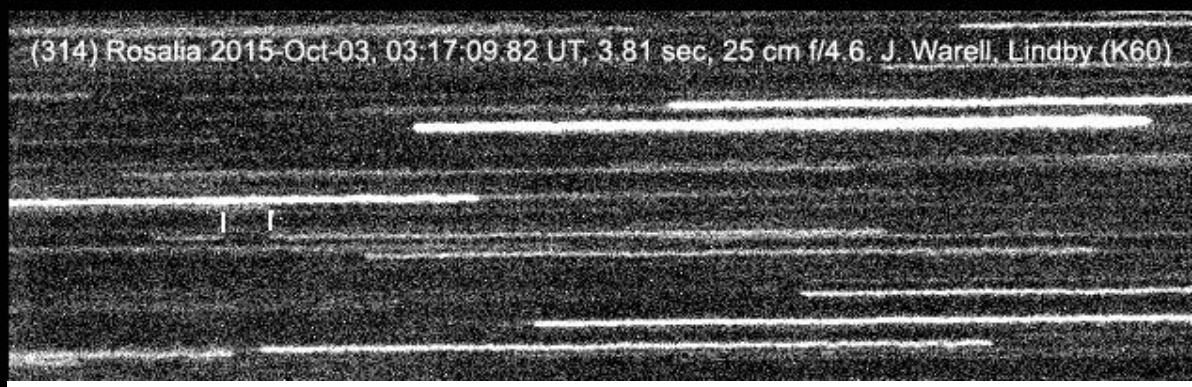
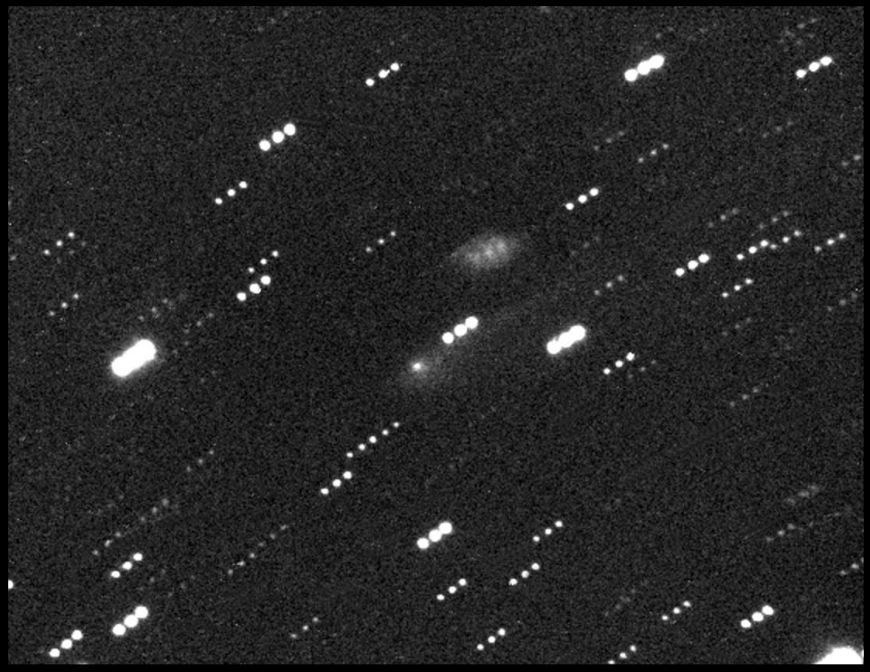
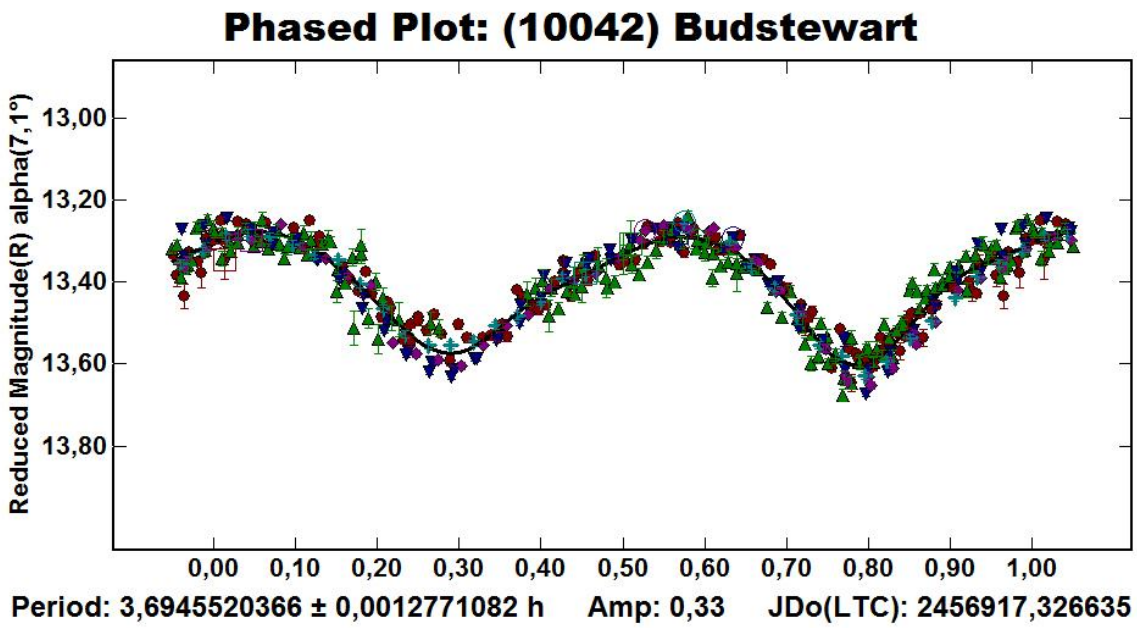
Lindby Observatory (K60)
22 cm Newton f/23 + DBK21AU618
T22, T52 under construction





67P/Churyumov-Gerasimenko 2016-Feb-04 2328 UT 8 x 60 sec FOV 21x16 arc min
25 cm f/4,6 SCT + SXV-H9 + Clear filter
Johan Warell Lindby Observatory (K60) Sweden



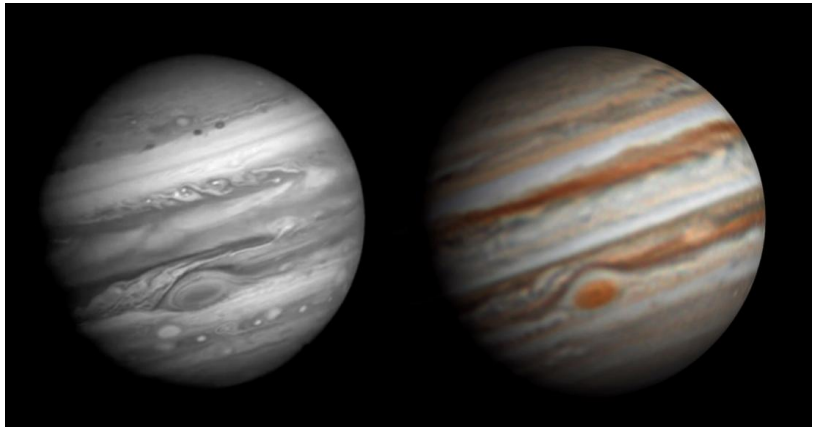

VOYAGER 3
PROJECT
Torbjörn Holmqvist
Martin Högberg
Roger Utas
Göran Strand
Peter Rosén
Noomi
Daniel Sundström
Project Initiator
Johan Warell
SCI-FIVE

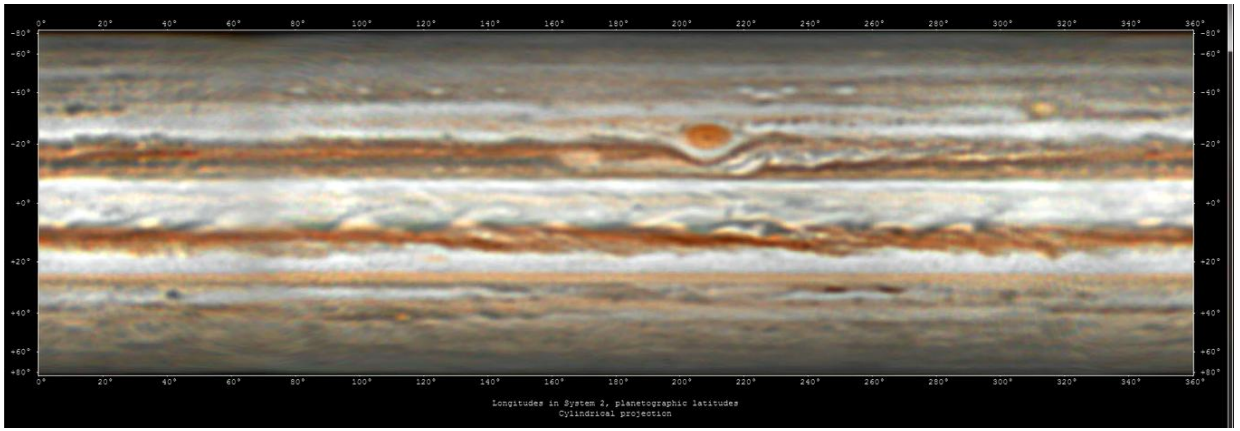
Creating an animation

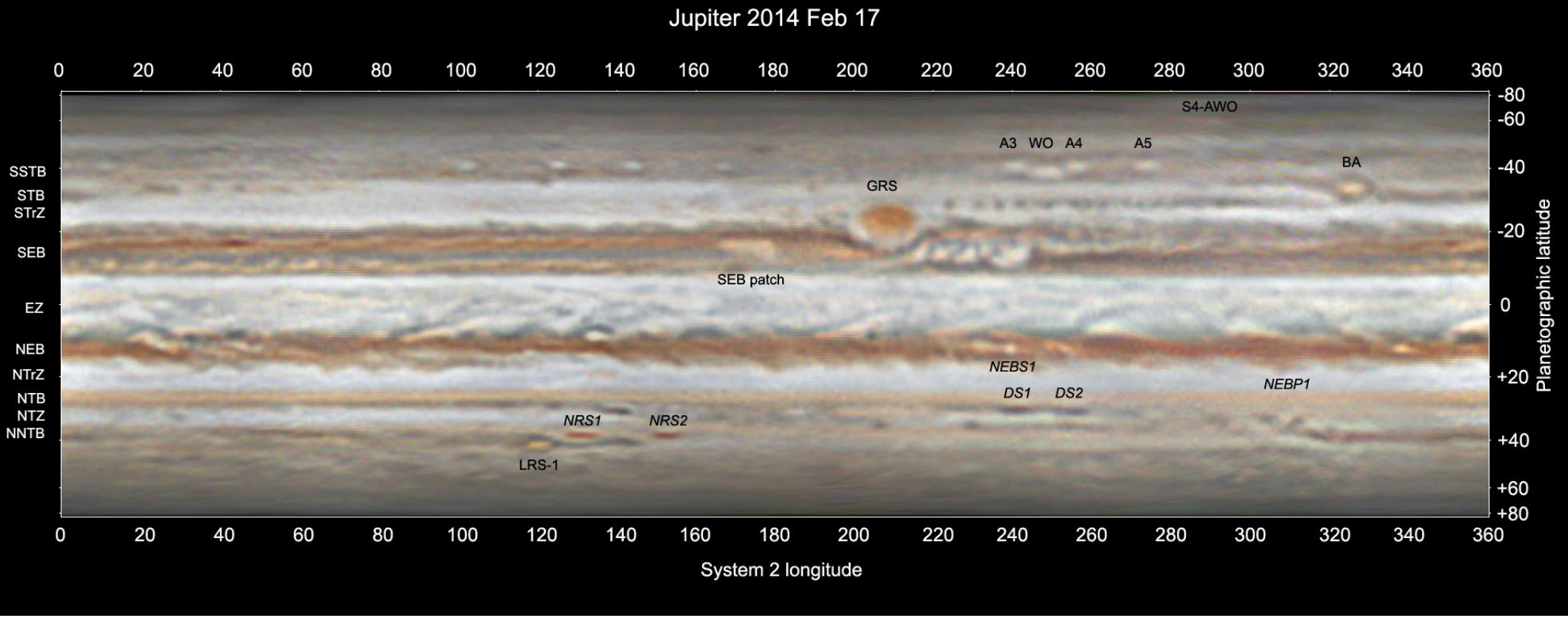
- Image acquisition and processing
- Image selection
- Post processing: color, brightness, contrast
- Standardised image filenames
- Navigation, timing correction and mapping
- Global map stitching
- Morphing to simulate data in-between samples
- Animation and presentation

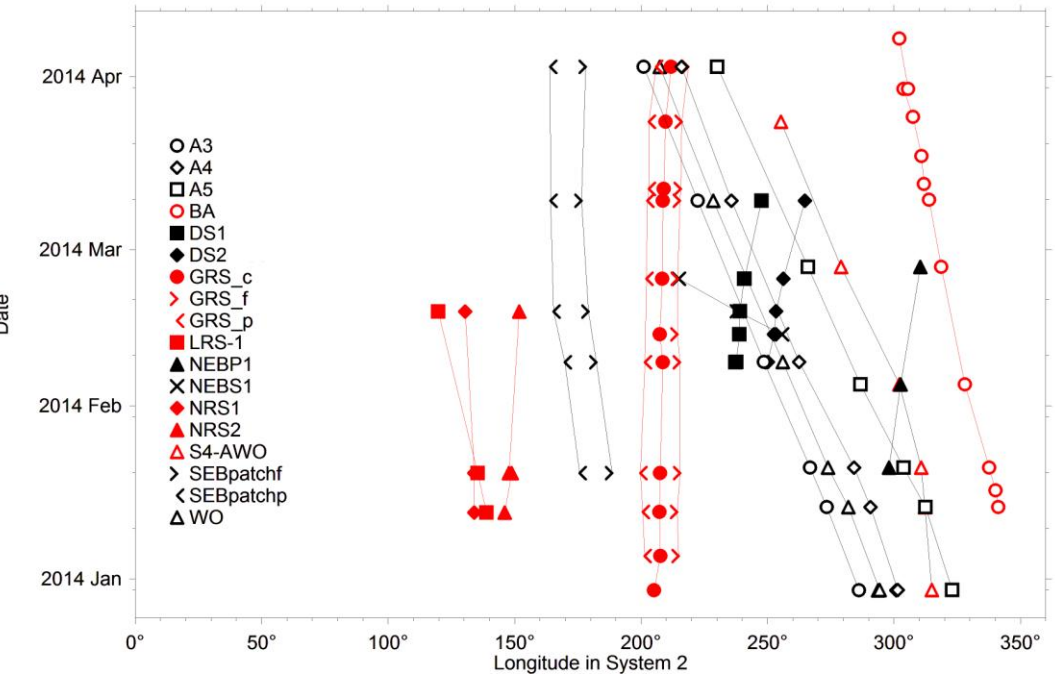
Voyager 3

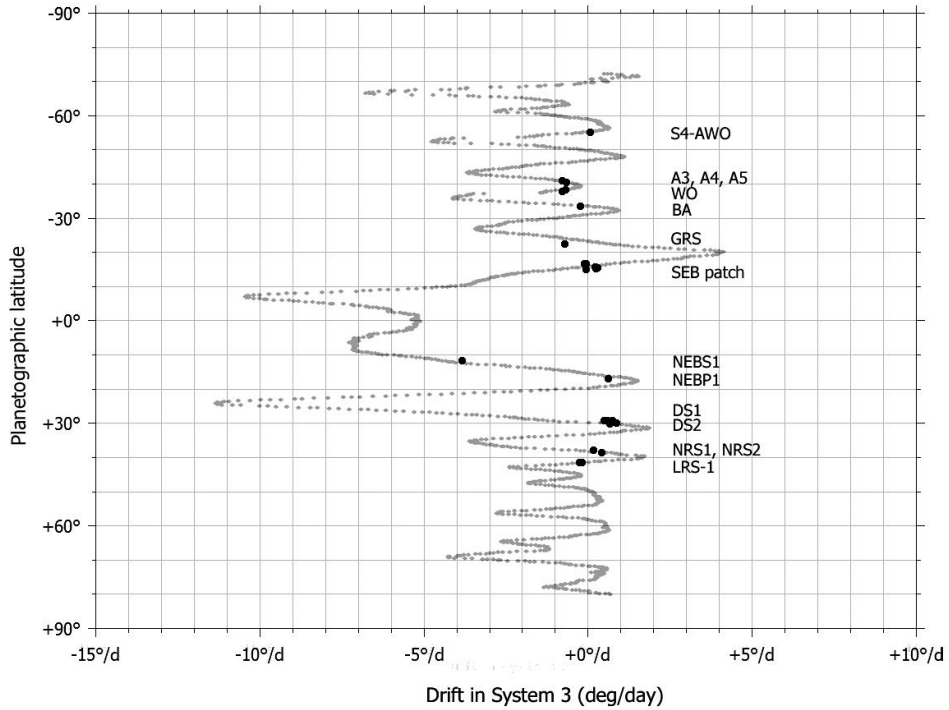
- 560 images January-March 2013 (about 200 sessions)
- 18 global maps from 5 days of images on average
- 72 morphed maps for one map per day (FantaMorph)
  - morphing of 4 regions separately: Sys I, Sys II and I/II transition regions
  - matching ends of maps to earlier/later maps
  - low-resolution data was beneficial
- Creating the flyby simulation (Starry Night Pro+ 6)
- Acquisition/processing: approx 500 h
- Post processing/animation: approx 2 000 h





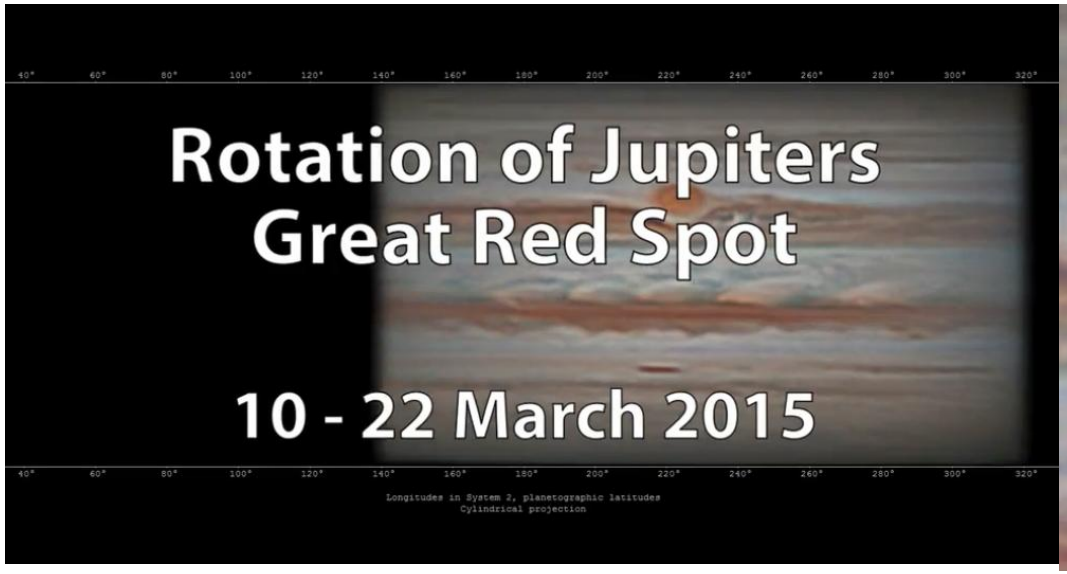

Jupiter 2014 Feb 17
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
SSTB
STB
STrZ
SEB
EZ
NEB
NTrZ
NTB
NTZ
NNTB
S4-AWO
A3 WO A4 A5
BA
GRS
SEB patch
NEBS1
DS1 DS2
NEBP1
NRS1 NRS2
LRS-1
-80 -60 -40 -20 0 +20 +40 +60 +80
Planetographic latitude
System 2 longitude

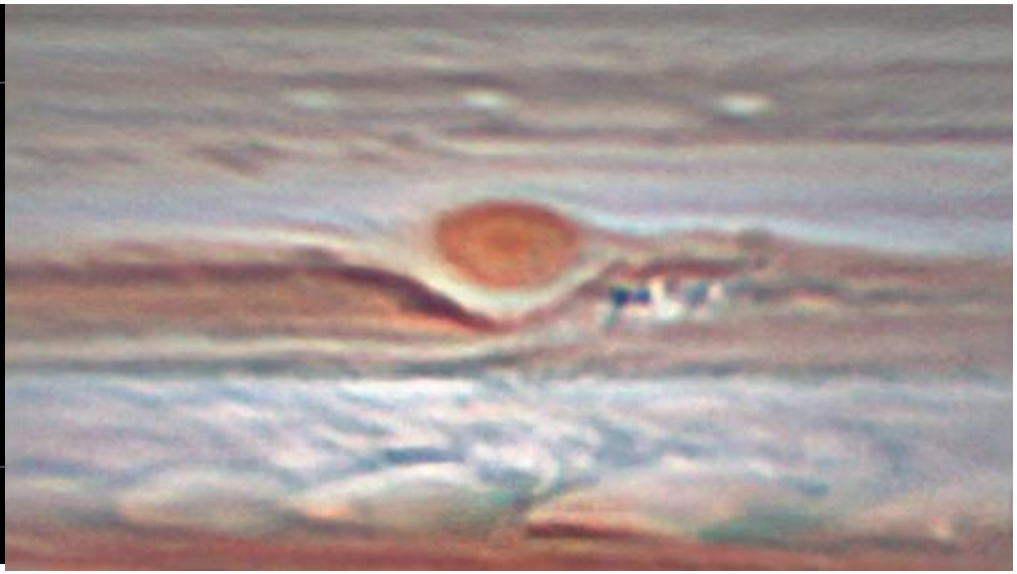

2014 Apr
2014 Mar
2014 Feb
2014 Jan
Date
A3
A4
A5
BA
DS1
DS2
GRS_c
GRS_f
GRS_p
LRS-1
NEBP1
NEBS1
NRS1
NRS2
S4-AWO
SEBpatchf
SEBpatchp
WO
0° 50° 100° 150° 200° 250° 300° 350°
Longitude in System 2


-90° -60° -30° +0° +30° +60° +90°
Planetographic latitude
S4-AWO
A3, A4, A5
WO
BA
GRS
SEB patch
NEBS1
NEBP1
DS1
DS2
NRS1, NRS2
LRS-1
-15°/d -10°/d -5°/d +0°/d +5°/d +10°/d
Drift in System 3 (deg/day)

Rotating GRS

- Animation based on images from 10-22 March 2015
- Capture the 4 day rotation of GRS
- Swedish team + Emil Kraaikamp, Anthony Wesley, Phil Miles, Trevor Barry
- 23 sessions, 160 images, 15 maps
- Still images + morphing

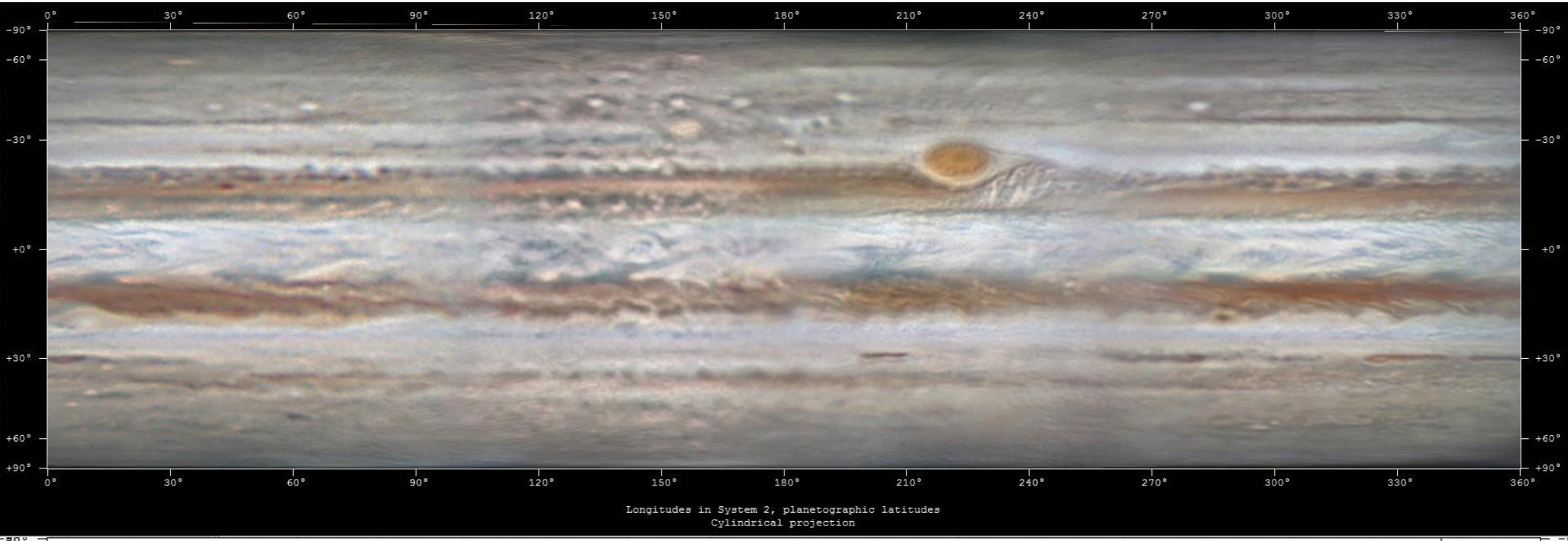


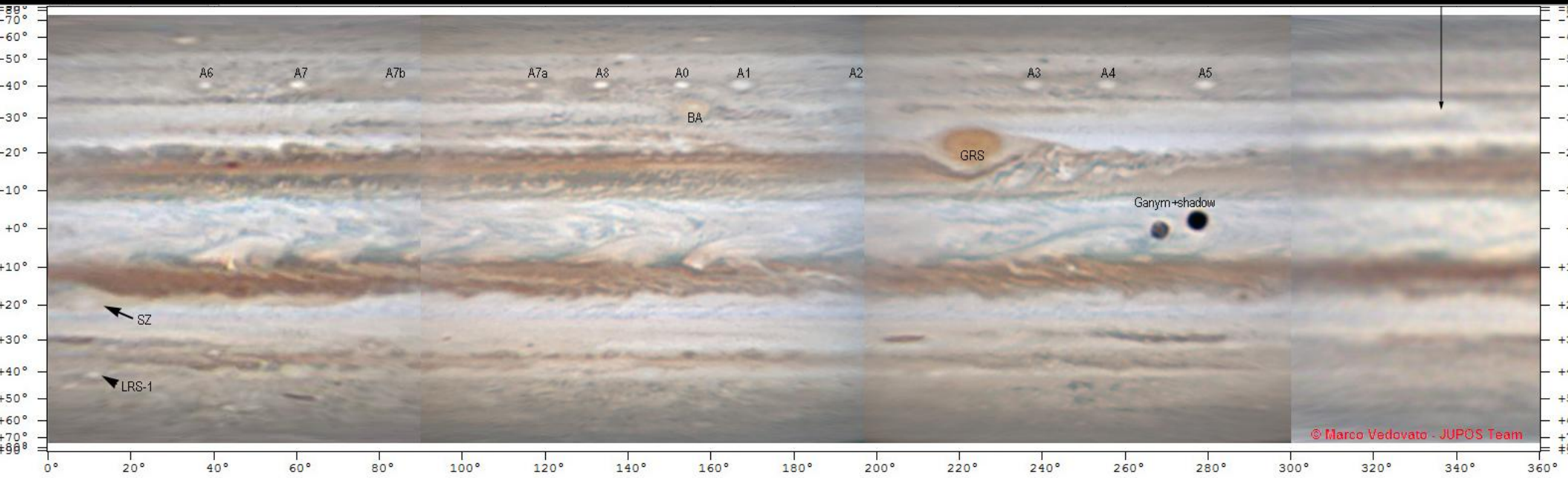


Global high-resolution animation

- Work in progress
- Dynamics of belts, cyclones and GRS rotation
- Period January-May 2015
- Highest quality image data available
- Contributions from 40 observers worldwide
- About 1 500 images selected
- One complete map every 2-4 days
- Morphing to achieve 1 map/day

Sample map February 7-10, 2015





Longitudes in System 2, planetographic latitudes
Cylindrical projection

M. Vedovato /2015 Feb 7-10 /JUPOS/ALPO-Japan

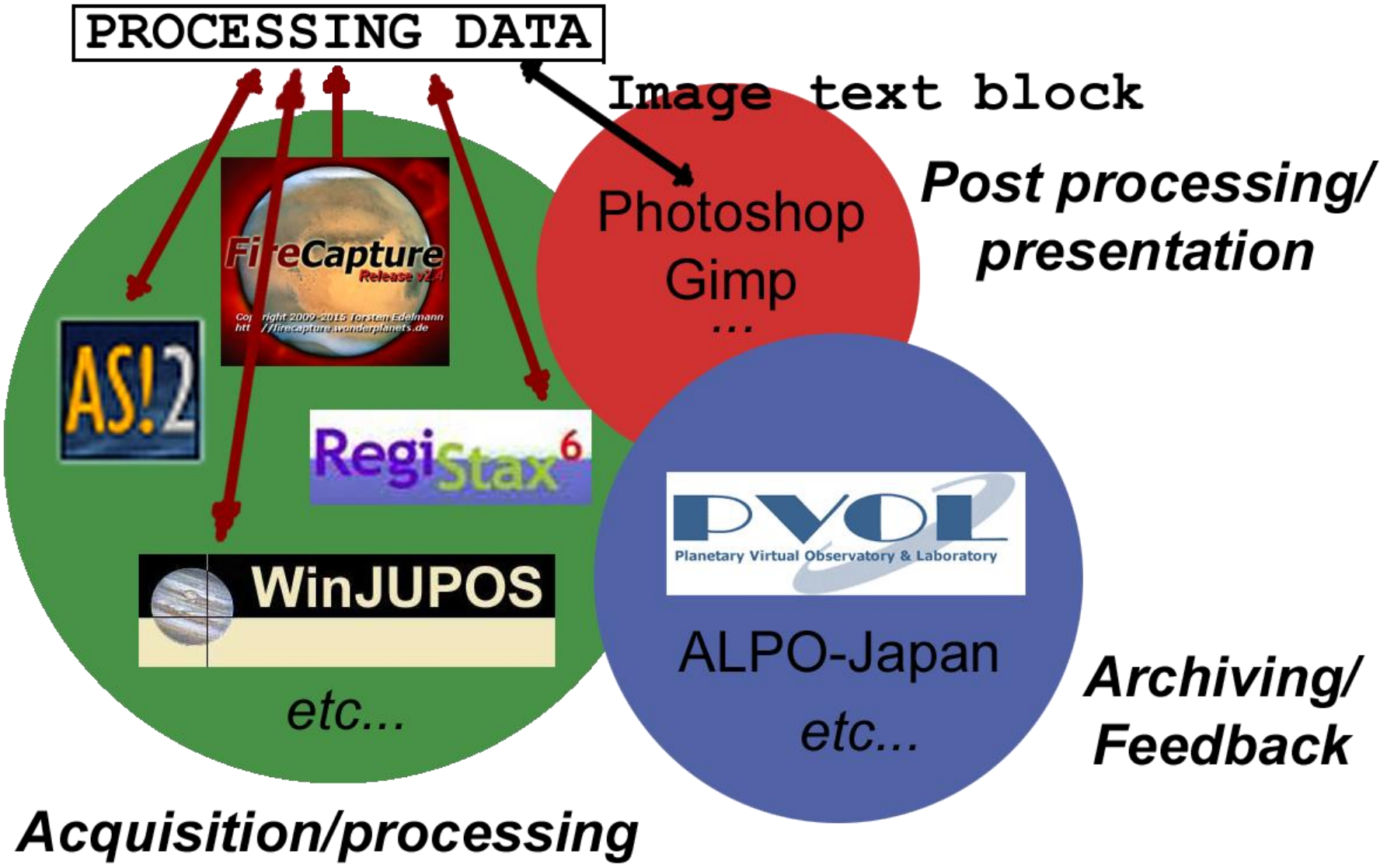
Optimal images for animation

- Minimal image-to-image variation
  - ”natural color”
  - well calibrated computer screen
  - compare images in PVOL or ALPO-Japan archives
- Moderate processing
  - keep unsharp masking radius small
  - maximizing detail and contrast may not be ideal
- Standard settings for animation purposes?
  - contrast, color, curves, limb darkening correction
  - sRGB profile

Easify observer contribution

- Common challenges
  - planetary imaging/processing is time consuming
  - proper documentation/archiving is cumbersome
  - images are posted ”everywhere”
- Effects
  - new astrophotographers are difficult to engage
  - valuable images may be missed, overview difficult
  - standards difficult to enforce > missing image data
- Possible solutions
  - seamless workflow from acquisition to archiving
  - standardised text information in final images
  - one flexible archive for everyone's needs

2016-03-29, 21:12:48 UT, CMI 337.5° CMII 49.9° CMIII 69,5°
α 4.3° , De -1.8°, diam. 43.7”
22 cm Newton @ f/23, DBK 21AU618, 0,22”/pix, derot 6x2 min
MPCC Mark III, PieroAstro ADC, x2.8 Klee Barlow, Baader UV/IR-block
Alt. 41 deg, Seeing 5/10, Transp 4/5
Johan Warell, Lindby Observatory (K60), Skurup, Sweden



Collaborating software chain

- File reading from same default directory
- Same file naming convention
  - strict, standardized name structure
  - additional information is appended at the end
- Processing data file inherited and expanded
  - text file with all image processing documentation + ephemeris
  - each software appends new processing data
- Image data presentation block
  - created/extracted at many points throughout chain
  - a snap to paste into final image without errors!

Global planet image archive

- One place to submit and archive data
  - internationally recommended and endorsed > ”all images”
  - all data types: images, maps, animations, drift charts...
  - based on PVOL and WinJupos databases?
- National/Association/Section data harvesting
  - search and tatistics on association and country levels
  - easy download of image batches and lists
  - eliminates need for national archives
- Feedback and reports
  - e-mail: regular reports with database statistics
  - web: statistics from global to personal level
  - inspiration for both established and new contributors
- COBS (Comet Observation Database) example : *www.cobs.si*

Thank you and good observing!